

Appl. No. 10/038,916

### **REMARKS/ARGUMENTS**

#### **Indefiniteness objections**

The Examiner objects to claims 1 and 11 contending that the expression "the de-mapper" in line 22 of the aforementioned claims should be replaced with "the symbol de-mapper" to establish a proper antecedent basis. In response, claims 1 and 11 have been amended in the manner suggested by the Examiner.

The Examiner objects to claim 28 alleging that the expression "at at" on line 2 of the aforementioned claim should be replaced with "on at" to clarify the subject matter claimed. In response, claim 28 has been amended in the manner suggested by the Examiner.

Applicant respectfully submits that amended claims 1, 11 and 28 are not indefinite and requests that the Examiner withdraw the indefiniteness objection against the aforementioned claims.

#### **Claim rejections – 35 U.S.C. 103**

In paragraph 4 of the detailed action, the Examiner has rejected claims 1, 4, 11, 14, 17 and 33 under 35 U.S.C. 103(a) as being unpatentable over United States Patent No. 6,611,513 ("Brink") in view of United States Patent Application Publication No. 6,175,590 ("Stein").

In response, Applicant respectfully submits that the Examiner has not fulfilled the requirements for establishing a *prima facie* case of obviousness. To establish a *prima facie* case of obviousness three basic criteria must be met. First, there must be some suggestion or motivation either in the references themselves or in the knowledge generally available to one of ordinary skill in the art to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The following analysis demonstrates that none of these requirements have been satisfied by the Examiner in respect of claims 1, 4, 11 and 14.

Appl. No. 10/038,916

**Requirement to disclose all features of the present invention**

Regarding claims 1, 4, 11 and 14, the Examiner alleges that Brink discloses in col. 4, lines 60-67 a transmitter and receiver adapted to transmit and receive comprising "an encoder (11), receiving as input the decoded output sequence produced by the soft decoder, said encoder being adapted to re-encode the decoded output sequence with an identical code to a code used in encoding the source data element sequence to produce a re-encoded output sequence". Applicant respectfully disagrees with the Examiner.

As recited in claim 1 of the present invention, the present invention provides a channel quality measurement apparatus adapted to measure a quality of a channel over which has been transmitted a sequence of symbols produced by encoding and constellation mapping a source data element sequence. Brink, however, teaches "a CDMA system, including a transmitter and receiver [emphasis added], for use in e.g. a digital wireless communications system" as outlined in the abstract of Brink. Col. 4, lines 60-67 of Brink teaches "[a]t the transmitter 10 [emphasis added] of FIG. 3, the binary random signal gets convolutionally encoded 11 and fed to a random bit interleaver 12 which interleaves the bit symbols". Therefore, the encoding occurs at the transmitter and not at the receiver. Accordingly, the encoder described in Brink does not "re-encode the decoded output sequence with an identical code to a code used in encoding the source data element sequence". Also, the encoder in Brink does not receive as input "the decoded output sequence produced by the soft decoder".

For at least the aforementioned reasons, Applicant submits that the Examiner has failed to demonstrate that the prior art references teach all of the claim limitations recited by claims 1, 4, 11 and 14 of the present application. Therefore, Applicant respectfully submits the requirement of teaching all limitations of the claim for establishing a *prima facie* case of obviousness has not been satisfied for claims 1, 4, 11 and 14.

**Requirement to establish motivation to combine references**

Applicant submits that the Examiner has not established motivation for combining Stein and Brink. The Examiner states that Stein is "in a similar fields of endeavour", but does not offer motivation for combining Stein and Brink. As outlined below, Applicant submits that

Appl. No. 10/038,916

Brink and Stein are significantly different from one another.

Brink relates to a CDMA system with iterative demapping of a received signal. As outlined in the Abstract, the invention concerns a CDMA system including a transmitter and a receiver for use in e.g. a digital wireless communication system and in particular to a method of an apparatus for mapping and demapping CDMA signals.

Stein relates to a method and apparatus for determining the rate of received data in a variable rate communication system. As outlined in the Abstract, Stein provides a method and apparatus for determining the rate of received data in a variable rate communication system.

Applicant submits that there can be no motivation to combine Brink and Stein, as they are significantly different from one another and such a combination requires significant modification to their teachings. Under section "2142.01 Suggestion or motivation to Modify References [R-1]" of the Manual of Patent Examining Procedure (MPEP), a "proposed modification cannot change the principle of operation of a reference". Applicant submits that the Examiner has not conformed to this. For example, with respect to Brink, the Examiner has referred to features of the receiver (e.g. col. 5, lines 22-38) with features of the transmitter (e.g. col. 4, lines 60-67) to allege that Brink teaches "an encoder (11), receiving as input the decoded output sequence produced by the soft decoder, said encoder being adapted to re-encode the decoded output sequence with an identical code to a code used in encoding the source data element sequence to produce a re-encoded output sequence". However, Applicant submits that the transmitter and receiver in Brink are separate apparatuses. By combining features of the two apparatuses of Brink, the Examiner is contemplating a substantial reconstruction and redesign of the elements shown in Brink as well as a change in the basic principle under which Brink was designed to operate.

For at least the aforementioned reasons, Applicant respectfully submits the requirement of establishing motivation to combine the cited references has not been satisfied for claims 1, 4, 11 and 14.

Appl. No. 10/038,916

**Requirement of reasonable expectation of success**

Under section "2143.02 Reasonable Expectation of Success Is Required" of the Manual of Patent Examining Procedure (MPEP), there must be "at least some degree of predictability" in respect of expectation of success. However, Applicant submits that the Examiner has not established that this requirement. It is again noted that the Examiner has not demonstrated how Stein and Brink can be combined to teach all of the limitations recited in the aforementioned claims. Moreover, there has been no established motivation for combining Stein and Brink. Therefore, it is reasonable to state that there cannot be a reasonable expectation of success for combining Stein and Brink. Therefore, Applicant respectfully submits that the requirement of establishing reasonable expectation of success for establishing a *prima facie* case of obviousness has not been satisfied.

For at least the aforementioned reasons, the Examiner is respectfully requested to reconsider and withdraw the rejection under 35 U.S.C. 103(a) against claims 1, 4, 11 and 14.

**Claim 17**

In paragraph 4 of the Detailed Action, the Examiner has rejected claim 17 alleging that Brink discloses "a method of determining a channel quality comprising correlating a soft data element decision sequence with a second data element sequence, the second data element sequence being produced by decoding the soft data element decision sequence to produce a decoded sequence and then re-encoding the decoded sequence" in col. 1, lines 54-67.

Applicant notes that the Examiner's rejection of claim 17 is not fully understood. On page 2 of the Detailed Action, the Examiner states that claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Brink in view of Stein. However, in rejecting claim 17 the Examiner has not referred to Brink and Stein. Instead, the Examiner seems to rely upon only Brink, as outlined on page 4 of the Detailed Action. In spite of not fully understanding the Examiner's rejection of claim 17, Applicant provides arguments against the Examiner's rejection.

Appl. No. 10/038,916

Applicant respectfully submits that Brink does not teach "decoding the soft data element decision sequence to produce a decoded sequence and then re-encoding the decoded sequence" at col. 1, lines 54-67 as the Examiner has alleged. Brink teaches that "the signal sequence is encoded twice at the transmitter in a serial manner" and "at the receiver the signal is first decoded by the inner decoder, the interleaved, and decoded by the outer decoder". This does not teach or hint "decoding the soft data element decision sequence to produce a decoded sequence and then re-encoding the decoded sequence".

The Examiner has not addressed the aforementioned difference between Brink and claim 17 of the present invention. Furthermore, the Examiner has not combined Brink with any other reference to arrive at claim 17 of the present application. In absence of a substantive argument by the Examiner, Applicant submits that claim 17 of the present invention is patentable under 35 U.S.C. 103(a). The Examiner is respectfully requested to reconsider and withdraw the rejection under 35 U.S.C. 103(a) against claims 17.

**Claim 33**

In paragraph 6 of the Detailed Action, the Examiner has rejected claim 33 under 35 U.S.C. 103(a) as being unpatentable over Brink in view of Stein and in further view of United States Patent No. 6,865,232 ("USP").

In response, Applicant respectfully submits that claim 33 is patentable over the cited references for at least its dependence upon claim 1. The Examiner is respectfully requested to reconsider and withdraw the rejection under 35 U.S.C. 103(a) against claim 33.

**Claims 2, 3, 5, 6, 12, 13, 15 and 16**

In paragraph 5 of the Detailed Action, the Examiner has rejected claims 2, 3, 5, 6, 12, 13, 15 and 16 under 35 U.S.C. 103(a) as being unpatentable over Brink in view of Stein as applied to claim 1, and in further view of United States Patent Application Publication 6,215,813 ("Jones").

In response, Applicant respectfully submits that claims 2, 3, 5, 6, 12, 13, 15 and 16, which are all dependent claims, are patentable over the cited prior art for at least their dependence upon their respective independent claims.

Appl. No. 10/038,916

**Claim rejections – 35 U.S.C. 102**

In paragraph 8 of the Detailed Action, the Examiner has rejected claims 7-10 and 39-41 under 35 U.S.C. 102(e) as being anticipated by United States Patent Application Publication No. 2002/0051498 ("Thomas").

Before setting forth a discussion of the prior art applied in the Office Action, it is respectfully submitted that controlling case law has frequently addressed rejections under 35 U.S.C. § 102. "For a prior art reference to anticipate in terms of 35 U.S.C. Section 102, every element of the claimed invention must be identically shown in a single reference." Diversitech Corp. v. Century Steps, Inc., 850 F.2d 675, 677, 7 U.S.P.Q.2d 1315, 1317 (Fed. Cir. 1988; emphasis added). The disclosed elements must be arranged as in the claim under review. See Lindemann Machinefabrik v. American Hoist & Derrick Co., 730 F.2d 1452, 1458, 221 U.S.P.Q. 481, 485 (Fed. Cir. 1984). If any claim, element, or step is absent from the reference that is being relied upon, there is no anticipation. Kloster Speedsteel AB v. Crucible, Inc., 793 F.2d 1565, 230 U.S.P.Q. 81 (Fed. Cir. 1986; emphasis added). The following analysis of the present rejections is respectfully offered with guidance from the foregoing controlling case law decisions.

**Claims 7-10**

Regarding claim 7, the Examiner alleges that Thomas teaches "correlating said re-encoded output sequence, and said sequence of soft data element decisions to produce a channel quality indicator output" in the abstract and in col. 3, section 0060. Applicant shall assume that the Examiner's reference to col. 3, section 0060 is intended to refer to page 3, section 0060, as the columns are not numbered in Thomas.

In response, Applicant respectfully traverses the Examiner's objection. Thomas teaches a decoding system and method for digital communications. As outlined in the Abstract, a Viterbi decoding system interprets bits in received QAM constellations as many value parameters rather than binary value parameters. It performs a Viterbi algorithm using these many value parameters to provide results superior to hard decision decoding. This is completely different than claim 7 of the present invention, which recites a method of measuring OFDM channel quality of an

Appl. No. 10/038,916

OFDM channel over which has been transmitted a sequence of OFDM symbols. Accordingly, there are distinct differences between claim 7 of the present invention and Thomas, as Applicant points out below.

Claim 7 of the present invention recites "symbol demapping [emphasis added] said sequence of received symbols to produce a sequence of soft data element decisions [emphasis added]" and "correlating said re-encoded output sequence, and said sequence of soft data element decisions [emphasis added] to produce a channel quality indicator output [emphasis added]". Therefore, the re-encoded output sequence is correlated with the result of symbol demapping. This is contrary to what is done in Thomas. As shown in Figure 15A of Thomas, the "Compare/Process" block receives as input the output from the "Interleave+Mapping" block and the output from the "FIFO Delay" block. The "Deinterleave+Demapping" block does not have an input into the "FIFO Delay" block and instead has an output to the "Viterbi FEC Decoder" block. Therefore, Applicant submits that the "Compare/Process" block does not correlate the re-encoded output sequence with the output of the symbol demapping. Furthermore, Thomas does not perform correlation to generate "a channel quality indicator output". Instead, Thomas teaches that the output of the "Compare/Process" block is coupled to the "Viterbi FEC Decoder".

The Examiner has not referred to Figure 15A of Thomas, but has instead referred to the Abstract and Section 0060 of page 3 of Thomas. However, the Abstract is silent to "correlating said re-encoded output sequence, and said sequence of soft data element decisions to produce a channel quality indicator output". Section 0060 of page 3 recites that "a position transmitted to a receiving station can be accurately correlated with a corresponding digital sequence in the constellation". However, Applicant submits that this does not teach "correlating said re-encoded output sequence, and said sequence of soft data element decisions to produce a channel quality indicator output".

For at least the aforementioned reasons, Applicant submits that claim 7 of the present invention is not anticipated by Thomas.

Appl. No. 10/038,916

Regarding claims 8, 9 and 10, Applicant submits that these claims are also not anticipated by Thomas for at least their dependence upon claim 7.

The Examiner is respectfully requested to reconsider and withdraw the rejection of claims 7-10 under 35 U.S.C. 102(c).

**Claims 39-41**

Regarding claim 39, the Examiner alleges that Thomas discloses a transmitter adapted to combine pilot and transmission parameter on a single overhead channel within an OFDM signal in col. 6, section 0091. Applicant shall assume that the Examiner's reference to col. 6, section 0091 of Thomas is intended to refer to page 6, section 0091, as the columns are not numbered in Thomas. In response, Applicant submits that Thomas does not teach combining pilot and transmission parameter on a single overhead channel. Instead, Thomas teaches on page 6, section 0091 that "the coder adds a redundant bit for every input bit, thereby doubling the number of bits transmitted for a given amount of data". Thomas goes on to teach that "in order to reduce part of this overhead, some of the coded bits may not be transmitted – that is, they may be hard punctured at the transmitter". The fact that the transmitter in Thomas adds a redundant bit for every input bit does not teach or imply "a transmitter adapted to combine pilot and transmission parameter on a single overhead channel". For at least this reason, Applicant submits that claim 39 of the present application is not anticipated by Thomas.

Regarding claims 40 and 41, Applicant submits that these claims are not anticipated by Thomas for at least their dependence upon claim 39.

The Examiner is respectfully requested to reconsider and withdraw the rejection of claims 39-41 under 35 U.S.C. 102(e).

The Examiner is respectfully requested to pass this application to allowance but, if there are any outstanding issues, the Examiner is respectfully requested to telephone the undersigned.




Appl. No. 10/038,916

In view of the foregoing, early favorable consideration of this application is earnestly solicited.

Respectfully submitted,

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